Ecosystem Exercise

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and
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LA vs. AZ Comparisons

Louisiana

- Climate
  - Humid,
  - Sub-tropical
  - Avg. yearly temp:
    - 81.9 °F in summer
    - 51.9 °F in winter
  - Avg. yearly rainfall: 57”

Arizona – Maricopa Co.

- Climate
  - Arid, desert
  - Avg. yearly temperature
    - 72 °F annual
  - Avg. yearly rainfall: 7.6”

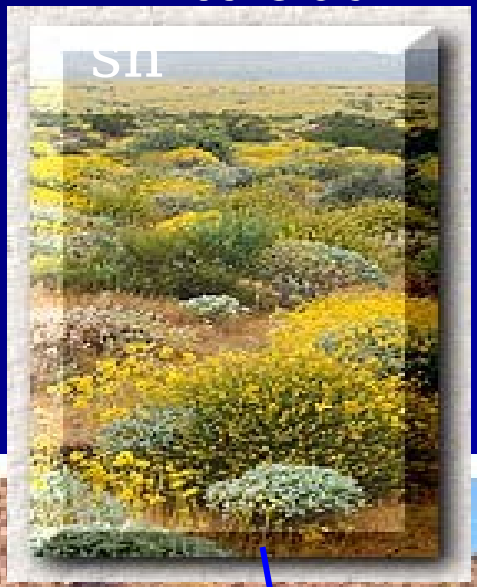
Agua Fria River
Phoenix, Arizona

INTRODUCTION

- Study area
- Population/Land Use Changes
- Problems from Public Perspective
- Significance of the Ecosystem to be Restored

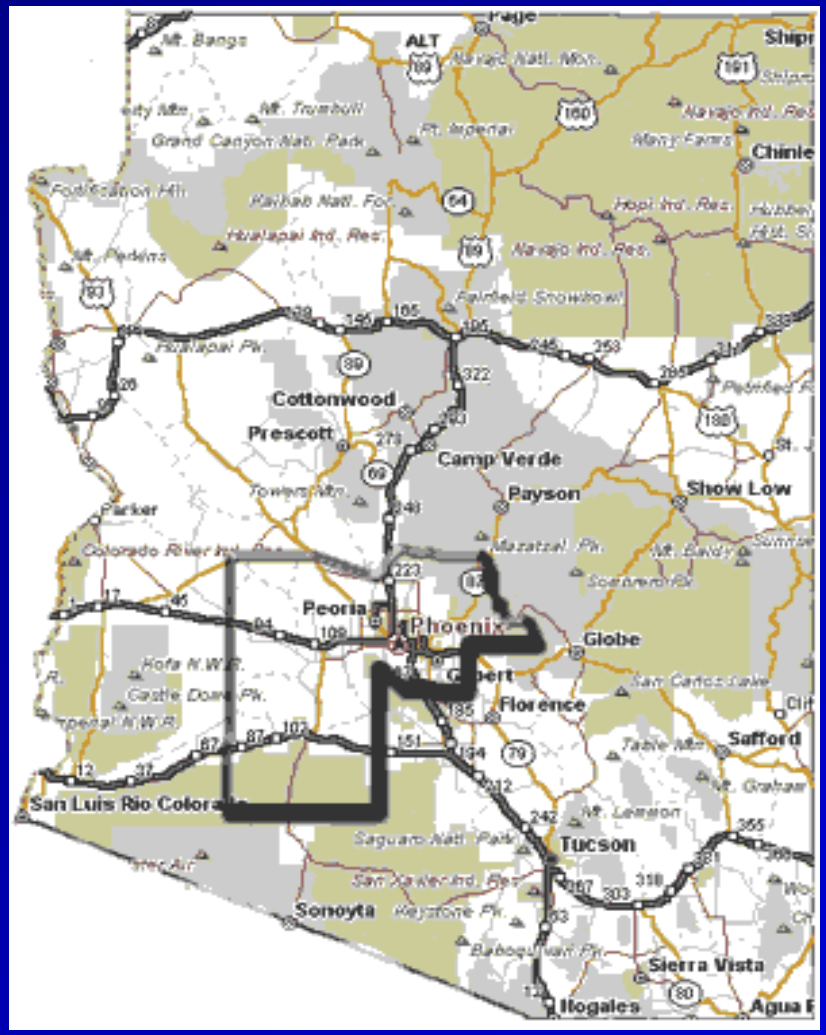
Sonoran Desert: Drought Tolerant Species

Brittlebu



Pear cactus flower

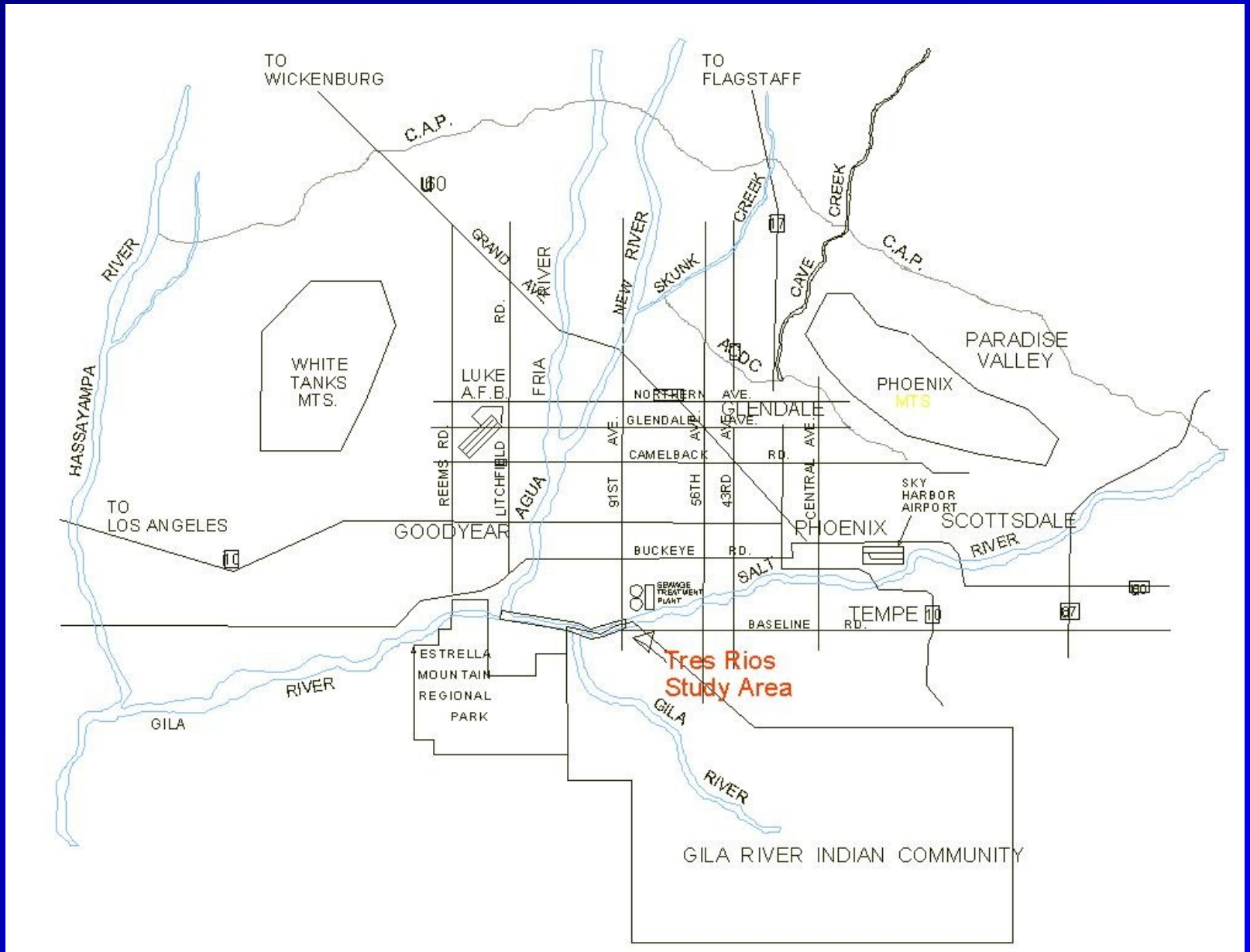
Maricopa County Climate Information



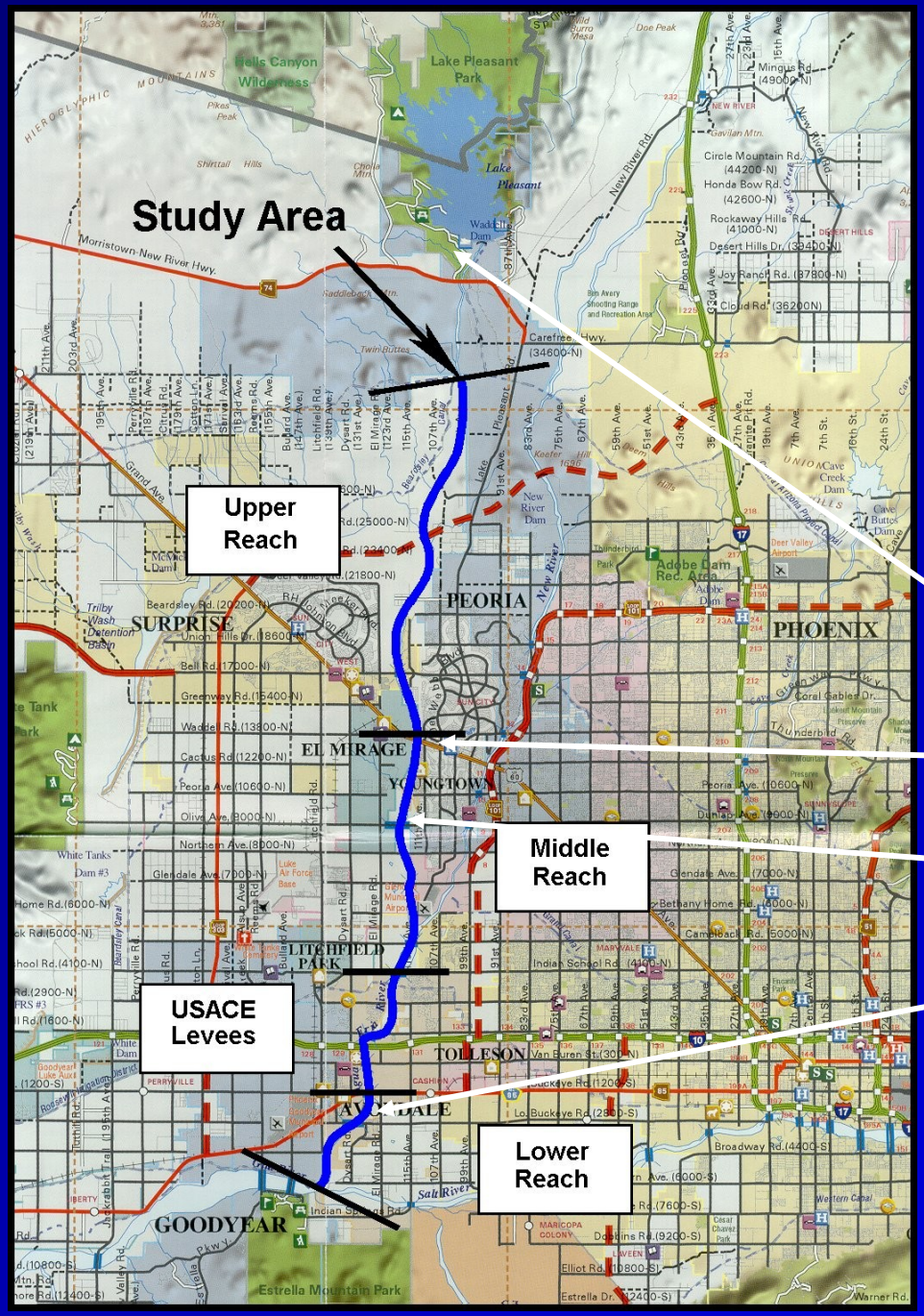
- Characterized by two rainy seasons (a.k.a. “monsoons”):
  - Winter (Dec – Feb)
  - End of summer (July – Aug)

UTAH
NEVADA
Colorado River
Little Colorado River
ARIZONA
NEW MEXICO
CALIFORNIA
Agua Fria River
Phoenix
Metropolitan
Area
Salt River
Gila River
MARICOPA
COUNTY
Santa Cruz River
MEXICO

AGUA FRIA RIVER STUDY LOCATION



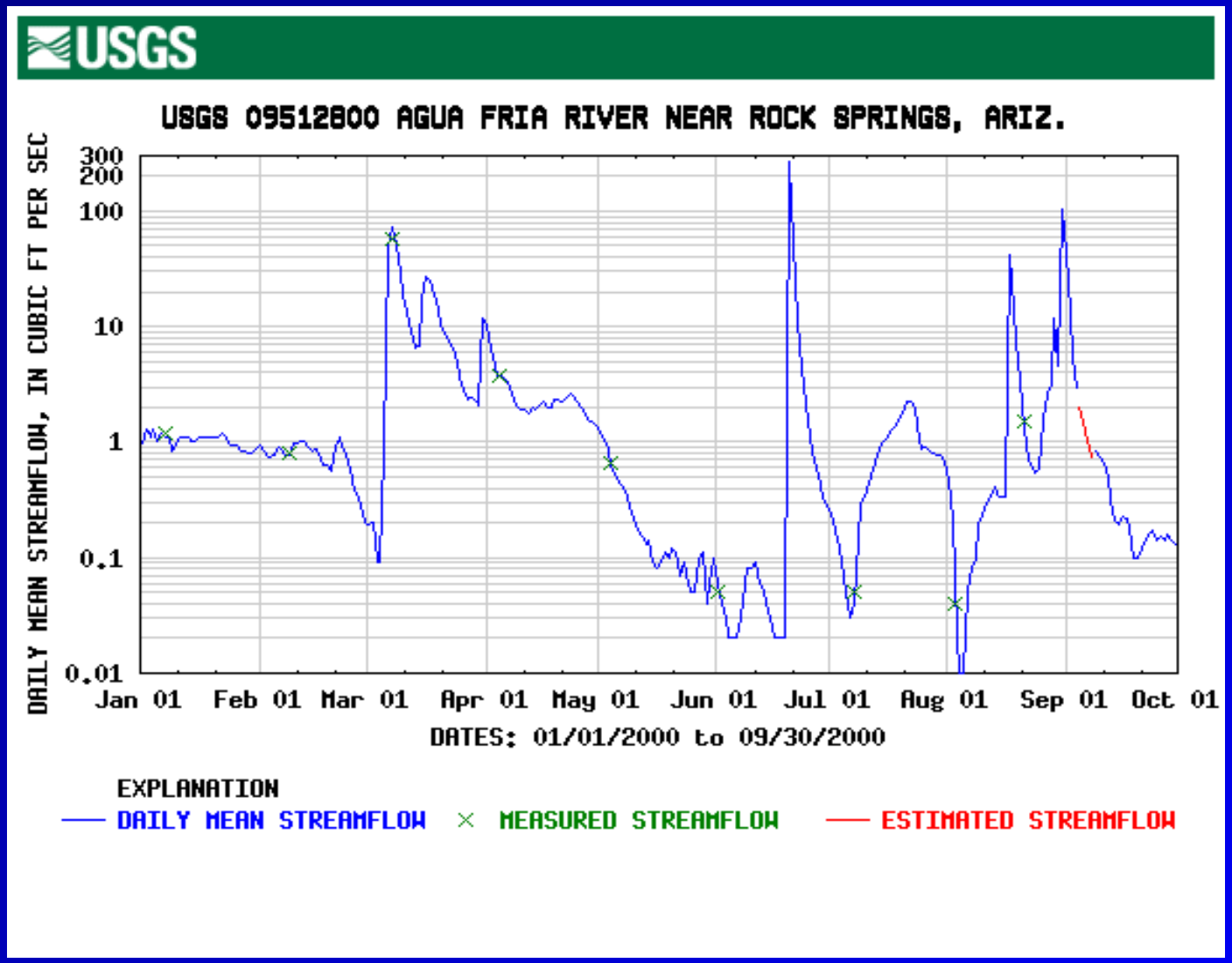
Agua Fria Study Area



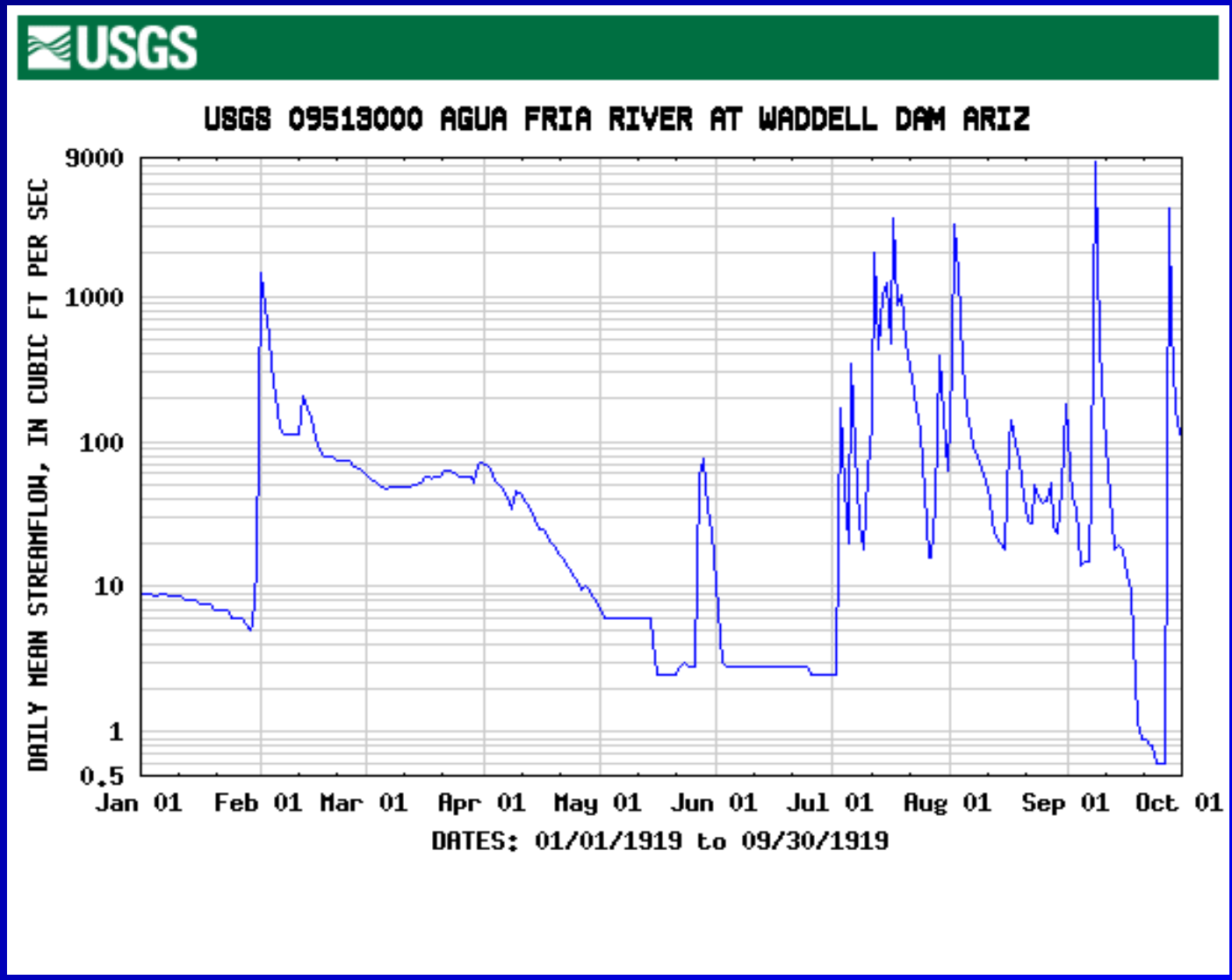
Hydrograph Info:

- Graph 1: North of Study Area – Rock Springs
- Graph 2: Waddell Dam
- Graph 3: El Mirage
- Graph 4: Youngtown
- Graph 5: Avondale

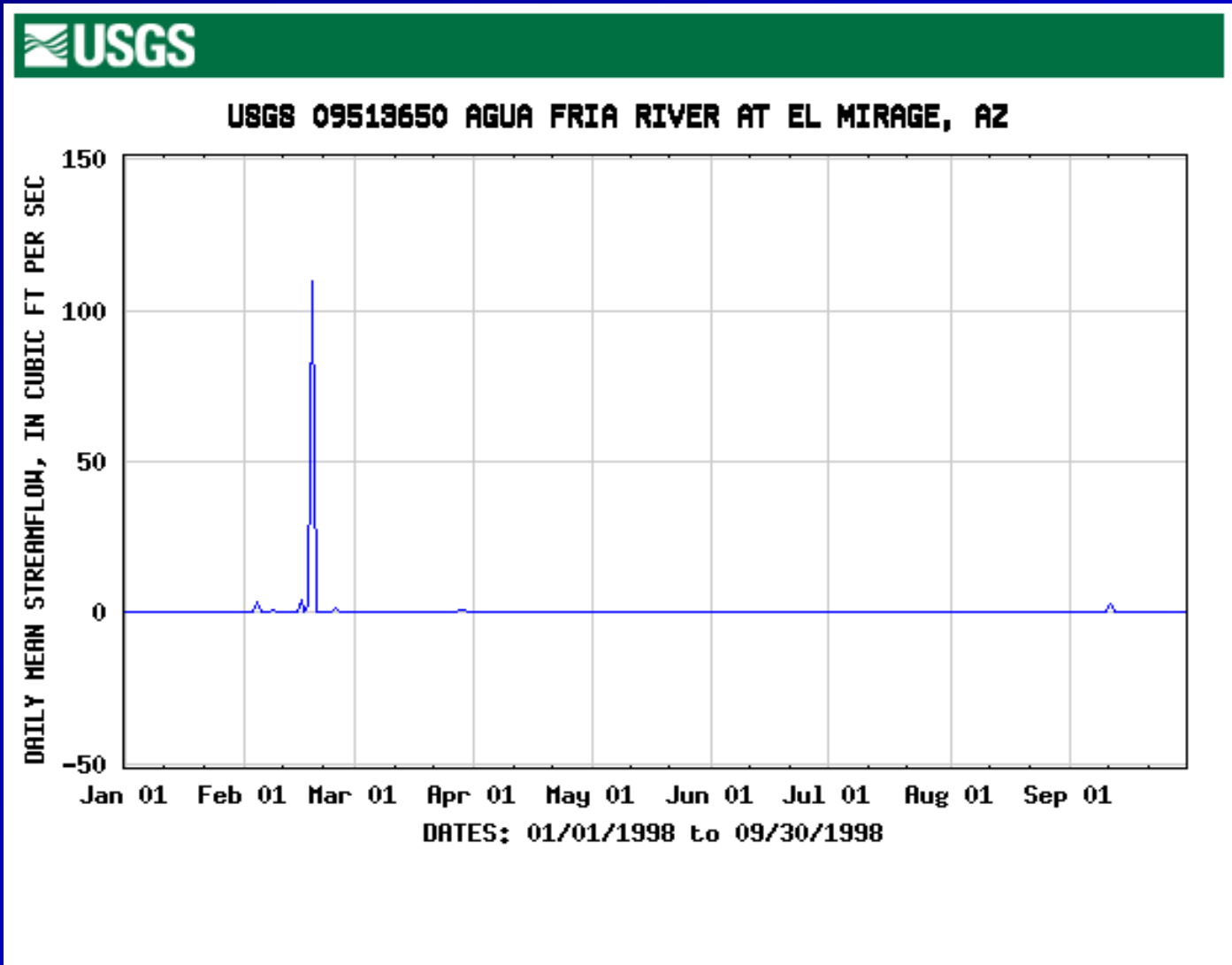
Above the Dam



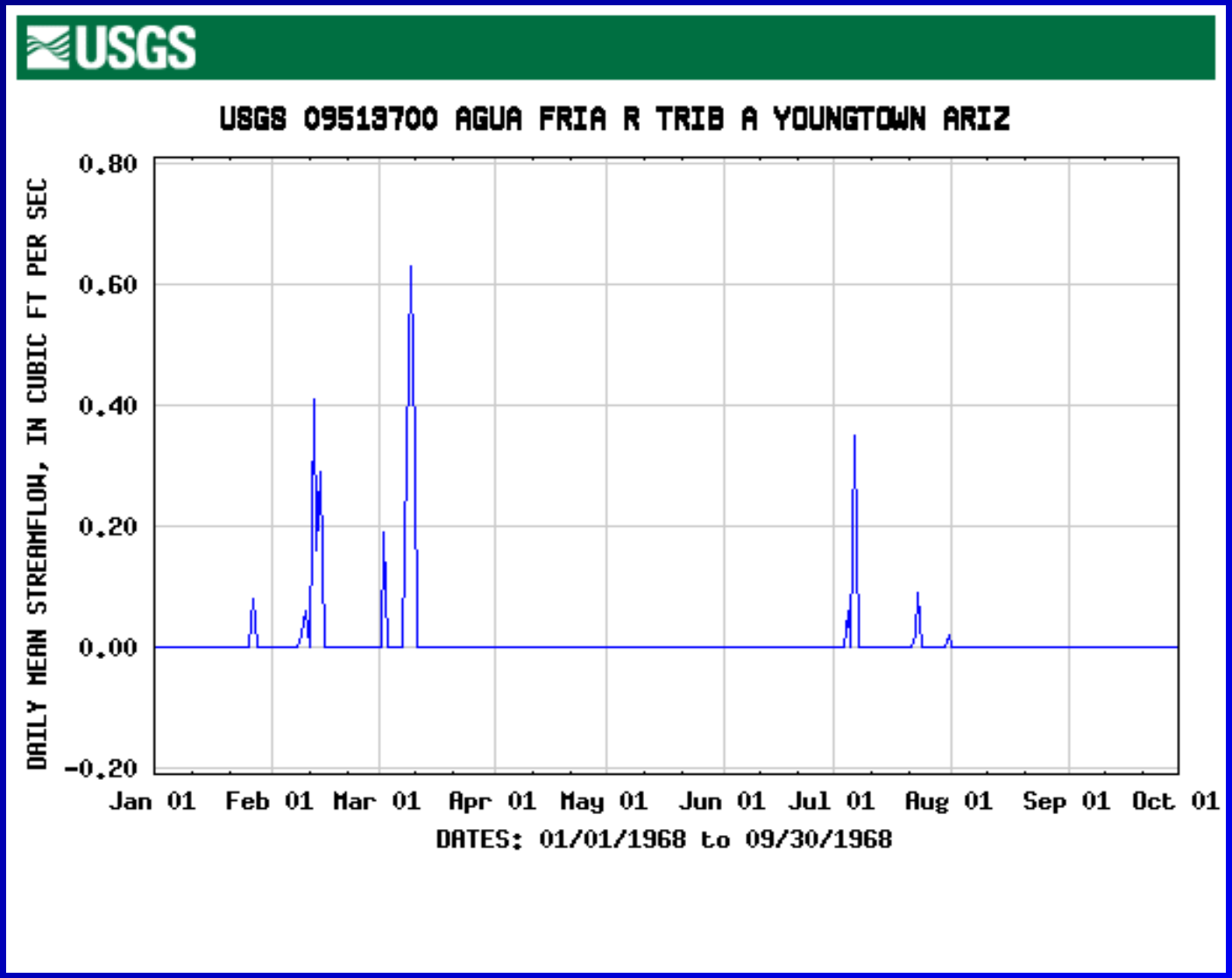
At the Dam


USGS
USGS 09513000 AGUA FRIA RIVER AT WADDELL DAM ARIZ
DAILY MEAN STREAMFLOW, IN CUBIC FT PER SEC
9000
1000
100
10
1
0.5
Jan 01
Feb 01
Mar 01
Apr 01
May 01
Jun 01
Jul 01
Aug 01
Sep 01
Oct 01
DATES: 01/01/1919 to 09/30/1919

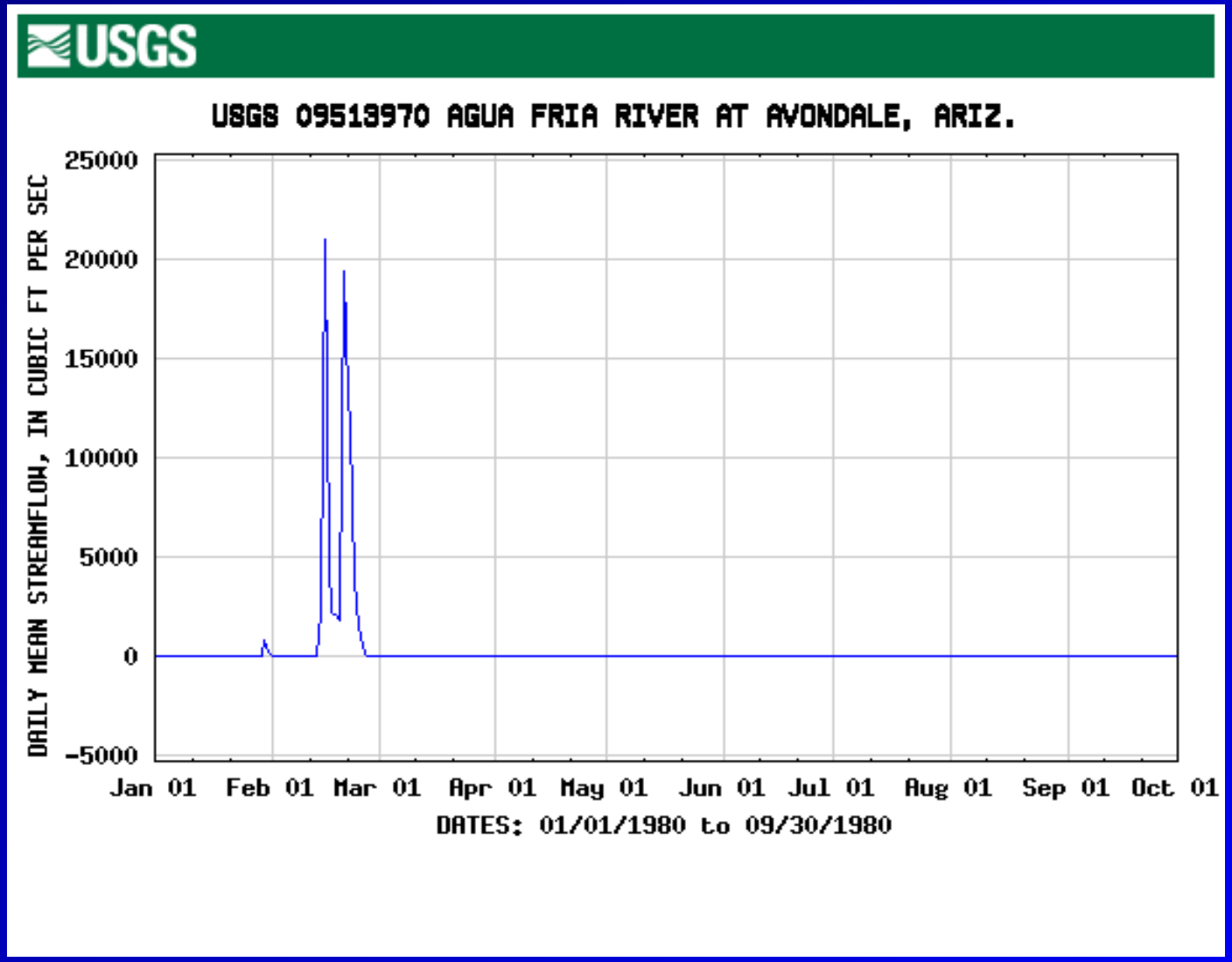
Below the Dam



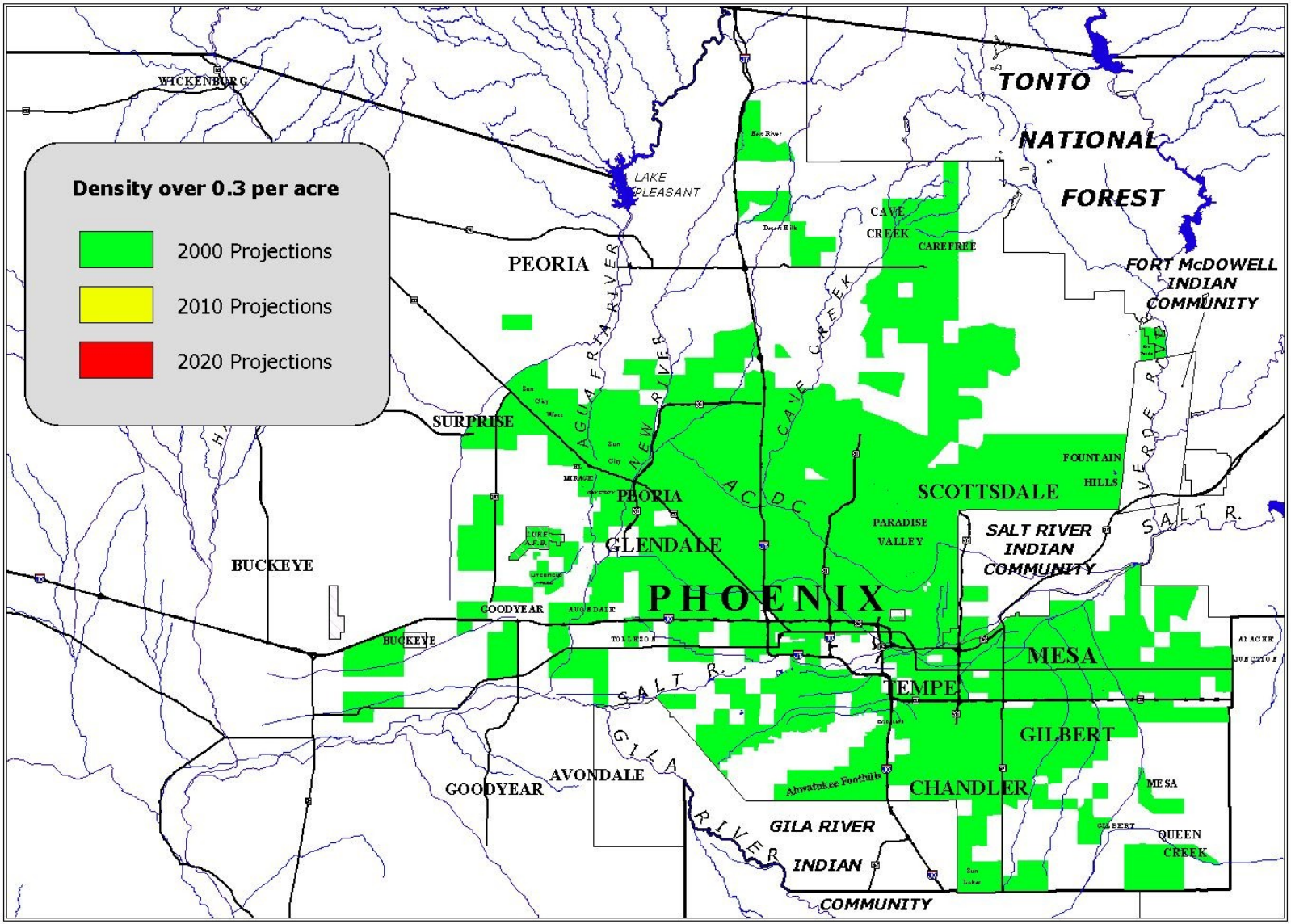
Below the Dam



Below the Dam



Population Density Projections, 2000 - 2020



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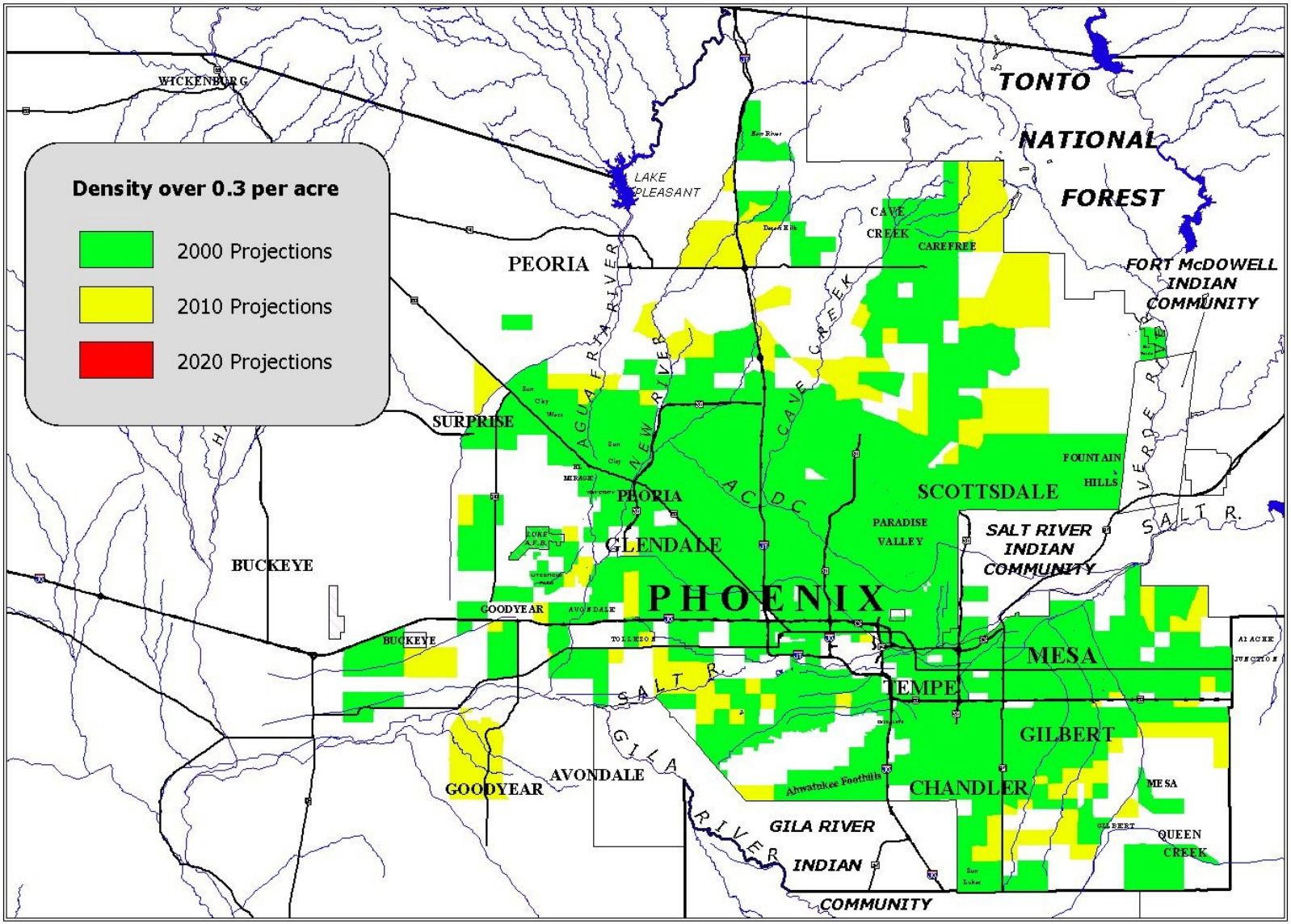

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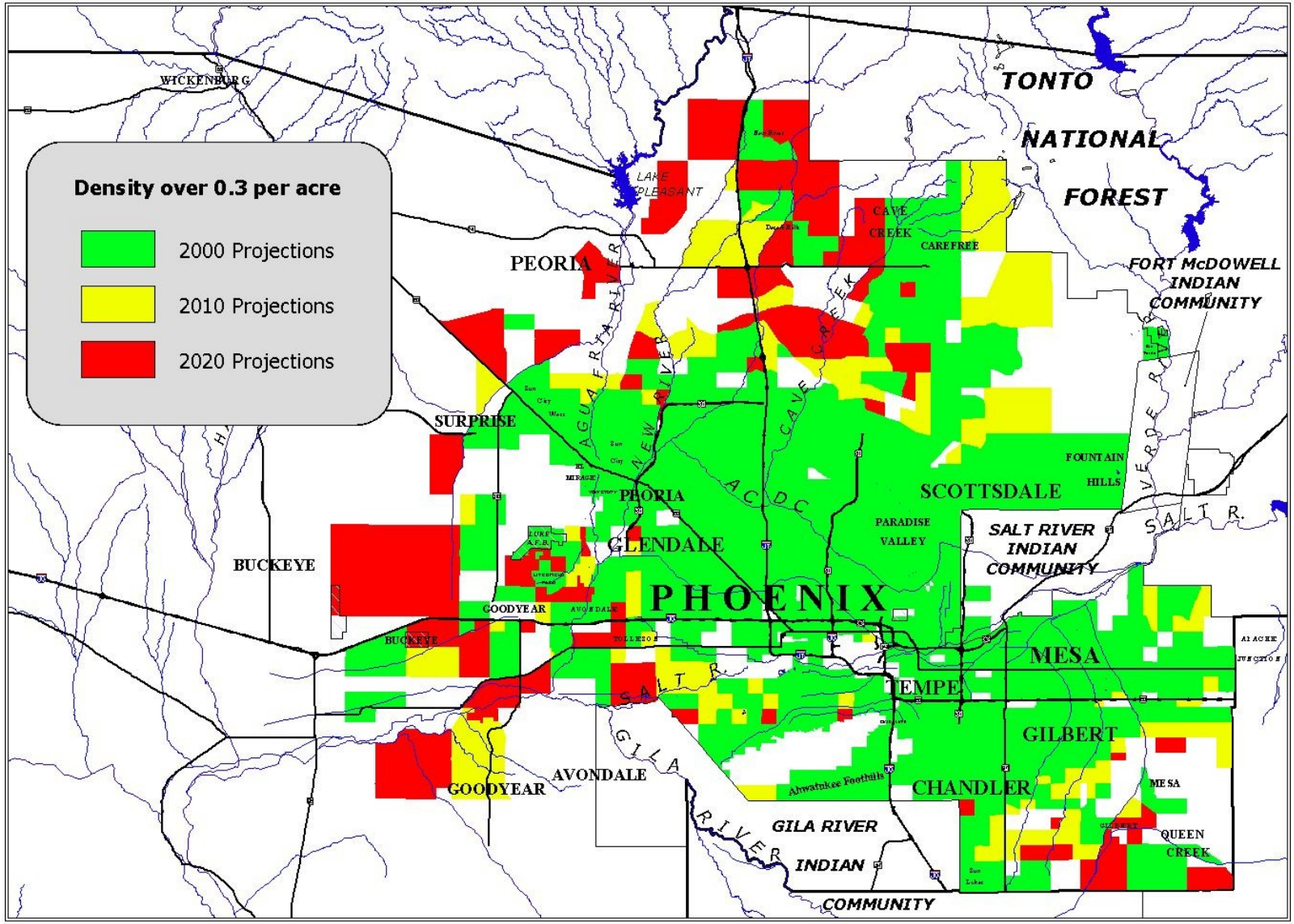


Public Concerns

Problems

Loss of Floodplain functions:

- Temporary storage of floodwaters
- Moderation of peak flows
- Maintenance of water quality
- Groundwater recharge
- Erosion Prevention

Problems

Shift in hydrology from perennial stream to ephemeral:

- Loss of riparian communities that are dependent on year-round water supplies

Potential for harm during floods:

- Loss of lives
- Decrease in property value

Public Concerns

Problem

- Negative downstream changes:
  - Scour below the dam
  - Channels choked with invasive vegetation
  - Decreased riparian habitat due to decreased flow

Opportunities

Desire for multiple use of floodplain:

- Flood risk management
- Recreation
- Ecosystem restoration & education

Agua Fria Conditions

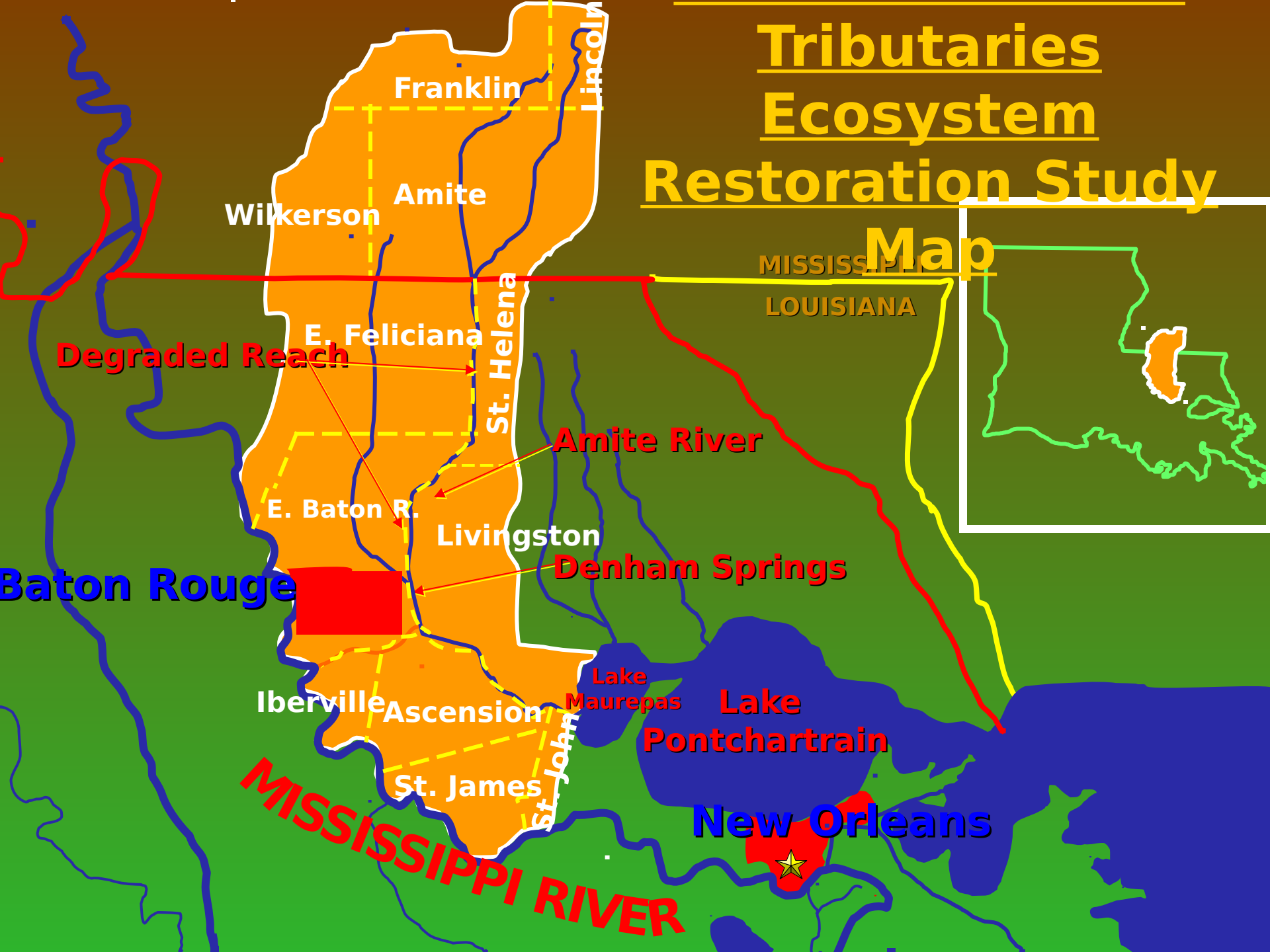
National Significance of Southwest Riparian Habitats

- As of 1988, less than 10% remained
- Per 1995, estimates concluded that 85-98% riparian zones lost
- Comprise less than 1% of AZ area
- 75-80% of AZ vertebrate species depend on this habitat for food, water, cover, and migration routes
- Each year, the number of bird species that use this type of habitat for breeding declines

Agua Fria Goals

Avondale Wetlands

Amite River
Baton Rouge, Louisiana


Tributaries Ecosystem Restoration Study Map
Franklin
Lincoln
Amite
Wilkerson
MISSISSIPPI
LOUISIANA
E. Feliciana
St. Helena
Degraded Reach
Amite River
E. Baton R.
Livingston
Denham Springs
Baton Rouge
Iberville
Ascension
Lake Maurepas
Lake Pontchartrain
St. James
St. John
New Orleans
MISSISSIPPI RIVER

194
0
LA 10

1994
LA 10

194
0

199
4

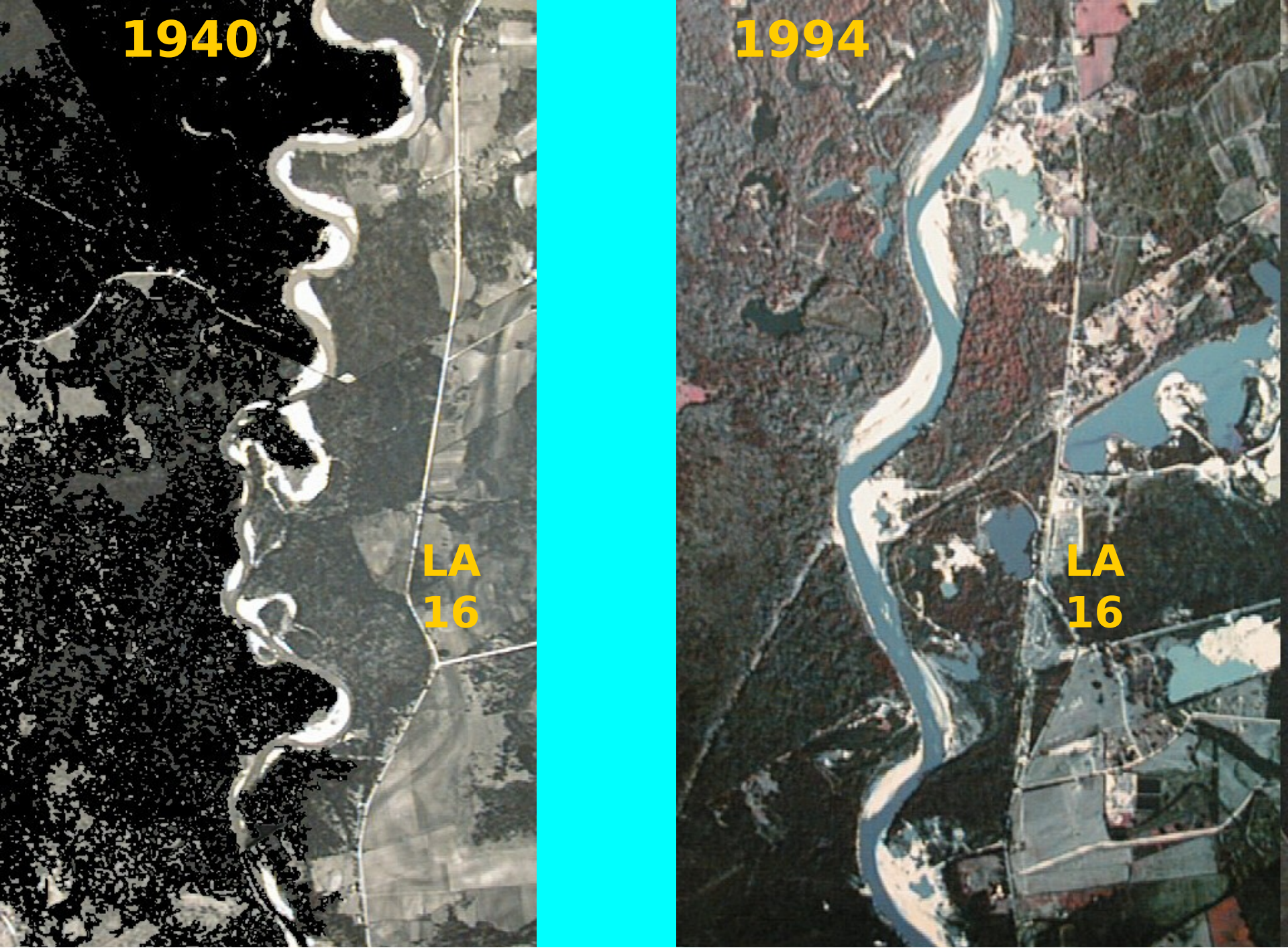
GRANGEVILLE

LA
37
194
0
GRANGEVILLE

LA
37
199
4

194
0
LA 16

199
LA 16


1940
LA
16
1994
LA
16

1940
Comite River
US

1994
Comite
River
US

Problems and Opportunities

Stressors – What is Broken?

- Loss of vegetation (over 10,000-12,000 acres), with lack of reforestation, wildlife habitat loss
- Cross section is shallower and wider, fishery loss
- 6 river miles lost since 1941 (10% mile loss)
- Increased suspended solids and bedload,
- Impacts to threatened inflated heel-splitter mussel
- Sinuosity reduced, bend ways lost
- Stream gradient Increased, braided channels, riffle/pool complex lost
- Increased stage vs. Q at Denham Springs

Ecosystem Exercise

Your objective is to develop the H&H study strategy for the river problem. You should:

- Identify all project objectives and constraints.
- Map out the H&H study. What types of data, analysis, and models are needed.
- List the benefits of the project.
- Be prepared for your team spokesperson to give a quick synopsis of your work.